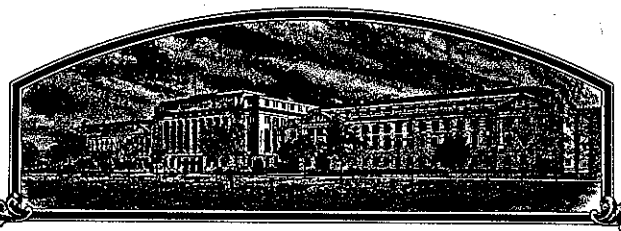
No. 8400072



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'9471'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington this 29th day of March in the year of our Lord one thousand nine hundred and eighty-five.

Attest:

Kenneth B. Hoss
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

John R Block
Secretary of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

FORM APPROVED
OMB NO. 40-R3822

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY	1b. VARIETY NAME	FOR OFFICIAL USE ONLY
	9471	PV NUMBER 8400072
2. KIND NAME: Soybean	3. GENUS AND SPECIES NAME: Glycine max	FILING DATE: 3/20/84 — TIME: 2:30 P.M. (XXX)
4. FAMILY NAME (BOTANICAL): Leguminosae	5. DATE OF DETERMINATION: October, 1978; January, 1982 (increase)	FEE RECEIVED: $ 1,800 / $ 200 — DATE: 3/20/84 / 3/18/85
6. NAME OF APPLICANT(S): Pioneer Hi-Bred International, Inc.	7. ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*): Capital Square, 400 Locust Street, Des Moines, Iowa 50309	8. TELEPHONE AREA CODE AND NUMBER: (319)277-1733

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (*Corporation, partnership, association, etc.*)	10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION	11. DATE OF INCORPORATION
Corporation	Iowa	1926

12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS:

Clark W. Jennings
Box 854
Cedar Falls, Iowa 50613

Dale L. Porter (copy)
Capital Square - 400 Locust St.
Des Moines, Iowa 50309

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- [X] 13A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
- [X] 13B. Exhibit B, Novelty Statement.
- [X] 13C. Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*
- [ ] 13D. Exhibit D, Additional Description of the Variety.

14a. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a). (If "Yes," answer 14B and 14C below.)* [ ] YES [X] NO

14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED?
[ ] YES [X] NO	[ ] FOUNDATION [ ] REGISTERED [ ] CERTIFIED

15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? [X] YES [ ] NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

14 March 1984 — (DATE)

Clark Jennings — (SIGNATURE OF APPLICANT)

(DATE)

(SIGNATURE OF APPLICANT)

FORM GR-470 (1-78)

Attachment: 9471 Soybean (March, 1984)

Exhibit A: Variety 9471 evolved from a cross of Williams X Essex. It is an F_6-derived variety which was advanced to the F_6 generation by modified single-seed descent. The F_7 progeny row of 9471 was grown in Indiana during the summer of 1978. Subsequently, 9471 has undergone five years of extensive testing and purification, and has been observed by the breeder to be uniform and stable for all plant traits from generation to generation, with no evidence of variants.

Seed hila of variety 9471 are light black in color, and under certain environmental conditions may appear imperfect black or gray in color. When seeds of these types are planted, they produce plants having seeds with light black hila color.

7 acres of 9471 (breeders seed) were grown in 1982. 190 acres of parent seedstock (foundation seed equivalent) were grown in 1983.

Attachment: 9471 Soybean (March, 1984)

Exhibit B: Variety 9471 is most similar to variety A4268. However, 9471 is significantly later than A4268 by 3 days (see Table 1).

Variety 9471 is also similar to the variety 9441. However, the cotyledons of each contain and express different isozymes of the protein enzyme "Phosphohexose isomerase" (PHI) as determined by using electrophretic techniques described and illustrated specifically for soybeans by Cardy and Beversdorf (in press)[1].

Cotyledons from variety 9471 produce a PHI-type B isozyme banding pattern, whereas cotyledons from variety 9441 produce a PHI-type A isozyme banding pattern. Each variety has been observed by the breeder to be uniform and stable for the expression of its respective isozyme pattern, with no evidence of variants.

1. Cardy, B.J. and Beversdorf, W.D. (in press) Identification of soybean cultivars using isoenzyme electrophoresis. (Submitted to Seed Science and Technology, May 1983.)

Table 1. Paired Comparison (Days to Maturity) 1980-83

YR/EXP/LOC#	9471(X_1)	A4268(X_2)	(X_1-X_2)	(X_1-X_2)^2
80/SJA4B2/39	145	141	4	16
80/SJA4B2/40	136	133	3	9
80/SJA4B2/41	123	119	4	16
80/SJA4B2/62	133	129	4	16
81/SJA4/31	136	132	4	16
81/SJA4/39	129	127	2	4
81/SJA4/40	121	117	4	16
81/UNA4/41	112	108	4	16
81/UNA4/45	113	109	4	16
81/UNA4/67	114	113	1	2
81/GRA4/70	108	104	4	16
81/SJA4B2/39	127	125	2	4
81/SJA4B2/40	123	117	6	36
81/SJA4B2/41	112	109	3	9
82/SJA4/39	142	138	4	16
82/SJA4/40	136	132	4	16
82/NPA4/51	135	129	6	36
82/UNA4/41	130	126	4	16
82/UNA4/67	123	120	3	9
82/GRA4/70	128	122	6	36
83/SJV4/39	139	135	4	16
83/SJV4/40	124	119	5	25
83/SJV4/41	110	107	3	9
Total	2,899	2,811	88	371
$\bar{X}$	126.0	122.2	3.8	

n = 23

$$s_{\bar{d}} = \sqrt{\frac{371 - [(88)^2/23]}{23(22)}} = 0.068$$

$$t_{(.05)} = \frac{\bar{d}}{s_{\bar{d}}} = \frac{126.0 - 122.2}{0.068} = 55.88 \text{ ** for 22 df}$$

Attachment: 9471 Soybean (October, 1984)

Exhibit B (Addendum): In addition to the PHI isozyme banding pattern differences between 9471 and 9441, they also differ in 'days to maturity'. 9471 is significantly later than 9441 by more than 3 days (see Table 2).

Variety 9471 is also similar to variety 4280. However, 9471 is significantly later than 4280 by 6 days (see Table 3).

TABLE 2. Paired Comparison (Days to Maturity) 1981-1983

YR/EXP/LOC#	9471(X_1)	9441(X_2)	(X_1-X_2)	(X_1-X_2)^2
81/SJA4/31	136	133	3	9
81/SJA4/40	121	119	2	4
81/UNA4/41	112	109	3	9
81/UNA4/45	113	108	5	25
81/UNA4/66	107	106	1	1
81/UNA4/67	114	111	3	9
81/GRA4/70	108	104	4	16
82/SJA4/31	118	112	6	36
82/SJA4/39	142	138	4	16
82/SJA4/40	136	131	5	25
82/UNA4/41	130	125	5	25
82/UNA4/65	121	118	3	9
82/UNA4/67	124	121	3	9
82/NPA4/51	135	132	3	9
82/SJA4B2/39	141	137	4	16
82/SJA4B2/40	137	132	5	25
82/SJA4B2/41	131	125	6	36
82/SJA4B2/62	136	130	6	36
82/SJV4/39	142	137	5	25
82/SJV4/40	138	132	6	36
82/SJV4/41	131	127	4	16
83/SJA4/31	123	113	10	100
83/SJA4/39	138	137	1	1
83/SJA4/40	122	120	2	4
83/UNA4/41	110	108	2	4
83/UNA4/65	100	99	1	1
83/NPA4/50	118	115	3	9
83/SJA4B2/39	141	136	5	25
83/SJA4B2/41	112	107	5	25
83/SJV4/39	139	136	3	9
83/SJV4/40	123	121	2	4
83/SJV4/41	110	109	1	1
Σ	4009	3888	121	575
$\bar{X}$	125.3	121.5	3.8	

$$s_{\bar{d}} = \sqrt{\frac{575 - [(121)^2/32]}{32(31)}} = 0.344$$

$$t_{(.05)} = \frac{\bar{d}}{s_{\bar{d}}} = \frac{3.8}{0.344} = 11.05 \text{ ** for 31 df}$$

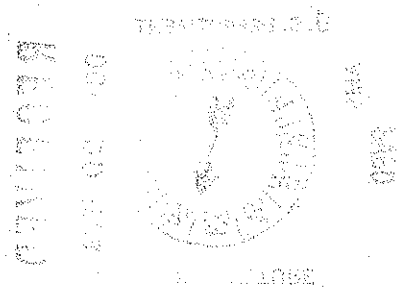
8400072

TABLE 3. Paired Comparison (days to Maturity) 1981-1983

YR/EXP/LOC#	9471(X_1)	4280(X_2)	(X_1-X_2)	(X_1-X_2)^2
81/SJA4/31	136	129	7	49
81/SJA4/40	121	117	4	16
81/UNA4/41	112	108	4	16
81/UNA4/45	113	105	8	64
81/UNA4/67	114	110	4	16
81/SJA4B2/39	127	123	4	16
81/SJA4B2/40	123	117	6	36
81/SJA4B2/41	112	109	3	9
81/SJA4B2/62	141	135	6	36
82/SJA4/39	142	135	7	49
82/SJA4/40	136	130	6	36
82/UNA4/41	130	122	8	64
82/UNA4/70	128	121	7	49
82/NPA4/51	135	130	5	25
82/SJA4B2/39	141	135	6	36
82/SJA4B2/40	137	130	7	49
82/SJA4B2/41	131	121	10	100
82/SJA4B2/62	136	127	9	81
82/SJV4/39	142	134	8	64
82/SJV4/40	138	130	8	64
82/SJV4/41	131	122	9	81
83/SJV4/39	139	133	6	36
83/SJV4/40	123	119	4	16
83/SJV4/41	110	105	5	25
Σ	3098	2947	151	1033
$\bar{X}$	129.1	122.8	6.3	

$$s_{\bar{d}} = \sqrt{\frac{1033 - [(151)^2/24]}{24(23)}} = 0.388$$

$$t_{(.05)} = \frac{\bar{d}}{s_{\bar{d}}} = \frac{6.3}{0.388} = 16.3 \quad ** \text{ for 23 df}$$



FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (Glycine max L.)

NAME OF APPLICANT(S)	TEMPORARY DESIGNATION	VARIETY NAME
Pioneer Hi-Bred International, Inc.		9471

ADDRESS *(Street and No., or R.F.D. No., City, State, and Zip Code)*
Capital Square
400 Locust Street
Des Moines, Iowa 50309

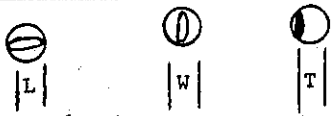
FOR OFFICIAL USE ONLY

PVPO NUMBER
8400072

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g., [0][9]).

1. SEED SHAPE:

[1]



1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)
4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

2. SEED COAT COLOR: (Mature Seed)

[1] 1 = Yellow 2 = Green 3 = Brown 4 = Black 5 = Other *(Specify)* _____

3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

[1] 1 = Dull ('Corsoy 79'; 'Braxton') 2 = Shiny ('Nebsoy'; 'Gasoy 17')

4. SEED SIZE: (Mature Seed)

[1][4] Grams per 100 seeds

5. HILUM COLOR: (Mature Seed)

[6] 1 = Buff 2 = Yellow 3 = Brown 4 = Gray 5 = Imperfect Black 6 = Black 7 = Other *(Specify)* _____

6. COTYLEDON COLOR: (Mature Seed)

[1] 1 = Yellow 2 = Green

7. SEED PROTEIN PEROXIDASE ACTIVITY:

[ ] 1 = Low 2 = High

8. SEED PROTEIN ELECTROPHORETIC BAND:

[ ] 1 = Type A ($SP1^a$) 2 = Type B ($SP1^b$)

9. HYPOCOTYL COLOR:

[2] 1 = Green only ('Evans'; 'Davis') 2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')
4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

10. LEAFLET SHAPE:

[2] 1 = Lanceolate 2 = Oval 3 = Ovate 4 = Other *(Specify)* _____

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Burrus

11. LEAFLET SIZE:

[2] 1 = Small ('Amsoy 71'; 'A5312') 2 = Medium ('Corsoy 79'; 'Gasoy 17') 3 = Large ('Crawford'; 'Tracy')

12. LEAF COLOR:

[2] 1 = Light Green ('Weber'; 'York') 2 = Medium Green ('Corsoy 79'; 'Braxton') 3 = Dark Green ('Gnome'; 'Tracy')

13. FLOWER COLOR:

[1] 1 = White 2 = Purple 3 = White with purple throat

14. POD COLOR:

[1] 1 = Tan 2 = Brown 3 = Black

15. PLANT PUBESCENCE COLOR:

[2] 1 = Gray 2 = Brown (Tawny)

16. PLANT TYPES:

[2] 1 = Slender ('Essex'; 'Amsoy 71') 2 = Intermediate ('Amcor'; 'Braxton') 3 = Bushy ('Gnome'; 'Govan')

17. PLANT HABIT:

[3] 1 = Determinate ('Gnome'; 'Braxton') 2 = Semi-Determinate ('Will') 3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

18. MATURITY GROUP:

[0][7] 1 = 000 2 = 00 3 = 0 4 = I 5 = II 6 = III 7 = IV 8 = V 9 = VI 10 = VII 11 = VIII 12 = IX 13 = X

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

[2] Bacterial Pustule *(Xanthomonas phaseoli* var. *sojensis)*

[0] Bacterial Blight *(Pseudomonas glycinea)*

[2] Wildfire *(Pseudomonas tabaci)*

FUNGAL DISEASES:

[0] Brown Spot *(Septoria glycines)*

Frogeye Leaf Spot *(Cercospora sojina)*

[0] Race 1 [0] Race 2 [0] Race 3 [0] Race 4 [0] Race 5 [ ] Other *(Specify)* _____

[0] Target Spot *(Corynespora cassiicola)*

[0] Downy Mildew *(Peronospora trifoliorum* var. *manshurica)*

[0] Powdery Mildew *(Microsphaera diffusa)*

[0] Brown Stem Rot *(Cephalosporium gregatum)*

[0] Stem Canker *(Diaporthe phaseolorum* var. *caulivora)*

9

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

[0] Pod and Stem Blight *(Diaporthe phaseolorum* var; *sojae)*

[0] Purple Seed Stain *(Cercospora kikuchii)*

[0] Rhizoctonia Root Rot *(Rhizoctonia solani)*

Phytophthora Rot *(Phytophthora megasperma* var. *sojae)*

[1] Race 1 [1] Race 2 [0] Race 3 [0] Race 4 [0] Race 5 [0] Race 6 [0] Race 7

[0] Race 8 [0] Race 9 [ ] Other *(Specify)* _____

VIRAL DISEASES:

[0] Bud Blight (Tobacco Ringspot Virus)

[0] Yellow Mosaic (Bean Yellow Mosaic Virus)

[0] Cowpea Mosaic (Cowpea Chlorotic Virus)

[0] Pod Mottle (Bean Pod Mottle Virus)

[0] Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

Soybean Cyst Nematode *(Heterodera glycines)*

[0] Race 1 [0] Race 2 [0] Race 3 [0] Race 4 [ ] Other *(Specify)* _____

[0] Lance Nematode *(Hoplolaimus Colombus)*

[0] Southern Root Knot Nematode *(Meloidogyne incognita)*

[0] Northern Root Knot Nematode *(Meloidogyne Hapla)*

[0] Peanut Root Knot Nematode *(Meloidogyne arenaria)*

[0] Reniform Nematode *(Rotylenchulus reniformis)*

[ ] OTHER DISEASE NOT ON FORM *(Specify):* _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

[1] Iron Chlorosis on Calcareous Soil

[ ] Other *(Specify)* _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

[0] Mexican Bean Beetle *(Epilachna varivestis)*

[0] Potato Leaf Hopper *(Empoasca fabae)*

[ ] Other *(Specify)* _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	A4268	Seed Coat Luster	A4268
Leaf Shape	A4268	Seed Size	A4268
Leaf Color	A4268	Seed Shape	A4268
Leaf Size	A4268	Seedling Pigmentation	A4268

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23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/ POD
				CM Width	CM Length	% Protein	% Oil		
9471 Submitted	126	2.1	114						
A4268 Name of Similar Variety	123	1.9	95						

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A_2 in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.